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<p>(54) Title: LAYERED MATERIAL INCLUDING INDICIA AND/OR SECURITY MEANS BETWEEN LAYERS</p>			
<p>(57) Abstract</p> <p>A multilayer structure (29) for use as a packaging material or as a constituent of a package for retaining an article or articles therein; wherein, the multilayer structure (29) includes at least two layers (21, 28) each having an inner (21a, 28a) and outer surfaces wherein the outer surfaces are exposed and the inner surfaces are in opposing relationship, wherein the multilayer structure includes between said layers, indicia and/or a security device (31) which is trapped therebetween and protected from physical contact with any object other than said opposing surfaces thereby providing security against tampering with the package or the contents of said package.</p>			

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LAYERED MATERIAL INCLUDING INDICIA AND/OR SECURITY MEANS BETWEEN LAYERS**BACKGROUND**

The present invention relates to product and product packaging identifying indicia and security and more particularly relates to a layered or laminated material including embedded identity and/or security means such as but not limited to printing and /or electronic security devices wherein said identity and/or security element is/are trapped between opposing surfaces of said layered or laminated material. The invention further comprises a method of production of a layered packaging material including identity and/or security means between layers of the laminated or layered material.

PRIOR ART

There are presently in existence a wide variety of product packages and materials used in their construction which employ a printed external surface conveying information and indicia relating to the products contained in the package. Known product packages also include labels, tags and the like applied direct to the product or to a surface of the product packaging. These forms of product indicia are prone to tampering due to the ease with which fake indicia can be substituted for the genuine products. In the case of drugs packaging, the printing on the external surface will include such data as trade marks, dosages, product constituents and the like.

There are many examples of such packaging in the drug, consumer health, animal health telecommunications and finance industries. For example, a typical package known as a blister pack is used in packaging drugs in individual compartments and generally comprises a laminated plastics material which is pre-heated and vacuum formed to a predetermined configuration. Typically, PVC may be used for the laminated plastics layers or PVC combined with another layer of either a derivative of PVC or other suitable plastics material.

In accordance with known methodology, in order to complete packaging of the product, the contents are brushed into receptacles in the plastics blister layer, following which a layer of material which is commonly metallic is applied to the plastics layer. Beforehand, an adhesive is applied to the metallic layer to ensure adequate sealing of the package. The described metallic layer may as an alternative be substituted with a plastics material.

The outer metallic or plastics layer traditionally includes on its outer surface printed material relating to the contents of the package as described above. The printing is usually placed on an outer surface ensuring no contact between the printing and the package contents. Although the printed product indicia on the outer surface is not in contact with the package contents it does make the printed surface and more particularly the printing vulnerable to unwanted damage and obliteration. Also, packages marked in this way are predisposed to counterfeiting due to the ease with which the package may be copied and the absence of indicia or security means which would otherwise make it difficult to pass off a counterfeit.

The desirability of avoiding contact between printing and product has resulted in printing usually appearing on a surface not in contact with the product but as a result causes the printing to be exposed to tampering and counterfeiting.

In the case of drug information and indicia usually conveyed by a printed layer, it is preferable that the printed layer remain in tact, but in conventional blister packaging, gaining access to the contents usually will involve damage to the metallic layer bearing the printing sometimes rendering the indicia illegible. Particularly in the case of drugs, it is preferable that product indicia remain in tact and it is important that printing on external layers of packaging is convenient and relatively inexpensive to produce but secure against tampering as the printing

layer may be reused on a counterfeit product package or copied. Printed layers are easy to replicate so it is relatively easy for counterfeiters to reproduce packaging thereby passing off a copy as the genuine article.

Printing on the external layer may be a disadvantage in the case where the information may relate to product constituents, regulatory or statutory information or to daily dosages of drugs, as full or partial obliteration may pose difficulties for the aged in keeping track of their drug regime. In addition, these packaging materials may not deter non approved use and counterfeiting as they are easy to copy without irreparable damage to the package.

Another example of a laminated plastics structure which includes a printed layer is the credit card which is generally composed of a multi layer structure employing commonly PVC or similar layers one of which includes printing on one layer. A clear PVC layer or resin is heat melted onto the outer layer to form an outer skin differing from the lamination examples previously described.

The printed layer can either be printed at the time of manufacture or when cards are stamped out then laminated. The advantage of this is to print in line at the time of PVC manufacture.

One of the main disadvantages of the the traditional packaging described above and with known credit cards is the ease with which the printing can be exposed to physical obliteration which has implications in counterfeiting and tamper evidence or other non intended use or duplication.

Where printed material is exposed, it is vulnerable to not only alteration but reproduction allowing the counterfeit trade to flourish particularly as the ability to differentiate between genuine product and counterfeits is difficult. Security of packaging is of primary importance particularly in the marketing of computer software, automotive and aircraft spare parts, music,

drugs and children's toys.

Manufacturers and distributors have tried various forms of security to guard against unwanted tampering and counterfeiting. Known security measures are applied to a package after manufacture. These methods are costly as they involve an additional security operation following manufacture of the product. The known forms of anti counterfeit or tamper evident packaging involve applying covert and/or security devices to packaging and /or to a product. In the prior art methods the packages generally do not provide security against substitution of counterfeit products for the genuine products.

There are a number of known methods for providing packagaing and identity security which include use of encryption, hidden indicia only accessible on the lock and key principle using a portable decoder, use of coatings to produce labels and foils which are brilliant but transparent to allow visual access to the information under the coating and the use of small but precise alphanumeric characters which are difficult to reproduce. Another known method involves the use of a laser written image individual pixel by pixel creating a unique signature design. Security hot stamp foils incorporating a holographic image or other optically variable device are effective in protecting currencies, cheques, documents and plastic cards where data in the document does not need to be protected by a laminate. Microthreads and microdots can be implanted woven or applied into a product but the consumer is not aware of their existence but the authenticity of the product can be easily checked by readers. Another known method involves the use of ultra violet printing which can be seen under a "black light".

Also known in the prior art is the use of security laminates for the protection of documents such as passports, identity cards, licenses and other identity documents. These laminates involve

surface writing and although they are "write resist" preventing alteration on the surface of the laminate, they are not suitable for use in packaging where forgeries are more easily passed off. There are also in existence, for use in security, optically variable coatings applied to documents, passports and the like. The above described security and product indicia measures are generally effective but they are not always appropriate for all products necessitating an alternative. There is a need to provide efficient and cost effective means of tamperproof product identity and security for not only products but also packaging of products. Furthermore, there is a need for cost efficient security by providing security means at the point of manufacture of products and product packaging materials in addition to or as a substitute for point of sale security. There is also a need for an effective tamper proof means of product identification and security and one which is expensive and difficult for counterfeiters to copy. Product and package substitution, tampering and counterfeiting is a rampant problem. This is particularly so in the aircraft spare parts, computer software, compact discs and drugs industries. Consumers need to be protected from counterfeit products but some counterfeits are so good that only the most discerning purchasers would if at all, be able to detect a fake from a genuine product. This is why it is necessary to have a high level of security and product identity.

INVENTION

The present invention seeks to ameliorate the aforesaid disadvantages of the known packaging indicia and product security measures by providing an alternative to the known methods of product indicia and security and which may be used in both products and packaging of products. The invention provides a multilayer material to be used on or in products or either as a complete package or as a constituent in packaging and including indicia and/or security between layers.

According to one embodiment, there is provided a package or a material for use in packaging including indicia such as print trapped between opposed surfaces of a laminated structure.

According to another embodiment there is provided a layered material for use in packaging including between layers of said material security means such as but not limited to a printing colouration, smart cards, microdots, microtext, foils, heat sensitive inks, optically variable devices and coatings, holograms trapped between opposed surfaces of a laminated material. One or more security indicia or devices can be used. For instance, according to one embodiment the packaging material may have between constituent layers a security device such as a microchip in addition to indicia such as printing or coloration. The use of security indicia or devices between layers of a material used in products or packaging ensures brand verification, prevents copying of products and product indicia for counterfeits and when used in packaging isolates the chosen security means from products in a package including the layered material. This is particularly important for products which are for human consumption such as drugs where contact between the product and certain packaging materials is either undesirable or prohibited by regulation. According to another embodiment, embedded indicia and /or security devices may be included in the construction of products from multilayer laminates which have concealed inner surfaces.

In one broad form the present invention comprises; a multilayer structure for use in a product or as a packaging material or as a constituent of a package for retaining an article or articles therein; wherein, the multilayer structure includes at least two layers each having an inner and outer surfaces wherein the outer surfaces are exposed and the inner surfaces are in opposing relationship and are concealed, wherein the multi layer

structure includes between said layers product identifying indicia and/or a security device which is protected from physical contact with any object other than said opposing surfaces the structure providing security against tampering with the package or said product.

In another broad form the present invention comprises a multilayered material for use as or in a package wherein the multi layered material includes a surface on which a security device and/or printing, colouration, product indicia or the like is placed; characterised in that the security device and/or printing, colouration, product indicia or the like is retained between layers of the multi layer material such that the security device and/or printing, colouration, product indicia or the like is not exposed to outside contact or to physical obliteration.

In another broad form the present invention comprises; a product including a multilayered material, wherein the multi layered material includes concealed surfaces between which or on which a security device and/or printing, colouration, product indicia or the like is placed; characterised in that the security device and/or printing, colouration, product indicia or the like is retained between layers of the multi layer material such that the security device and/or printing, colouration, product indicia or the like is not exposed to outside contact or to physical obliteration. The product including the multilayer construction with security indicia or devices may be a compact disc.

In another broad form the present invention comprises; a multilayered material for use as or in a package wherein the multilayered material includes a surface on which printing or like indicia is placed; characterised in that the indicia is retained between layers of the multi layered material such that the printing is not exposed to the outside or to direct physical contact with a product retained by said package other than contact with the surface the printing is on and with an

opposing surface and further characterised in that said multilayered material further includes in addition to said printing or the like a security device selected from one or more of a micro chip, silicon chip, sim card, memory chip, hologram, liquid crystal or the like. Preferably, the multilayer structure will include two or more layers such that there will be at least one pair of opposing surfaces on or between which said security means are placed. Other forms of security devices can be introduced between layers such as laser etching on a concealed layer.

Alternatively, the security device and/or indicia may be introduced onto a third layer which is concealed between and is retained by opposing layers.

In an alternative form the present invention comprises a package for containing a product wherein the package material comprises at least one transparent laminated layer including two or more constituent layers wherein at least one surface other than surfaces exposed to the outside of the package includes printing between layers such that the layers provide a barrier against physical access to and obliteration of said printing.

According to an alternative embodiment, some or all of the multilayer material may be opaque.

In another form the present invention comprises a package including a laminated layer of transparent plastics material wherein the laminated layer is a composite of at least two transparent constituent layers wherein at least one surface of the constituent layers includes information which is printed or otherwise displayed between said layers such that the printing or said other information is permanent and is physically inaccessible but the information is visually accessible and not in contact with the contents of said package.

Preferably, the layered transparent material comprises at least two separate constituent layers wherein a surface of one said constituent layer opposes a surface of another constituent layer to

provide inner surfaces wherein printing or like indicia and/or security means on one or both of said opposing inner surfaces is trapped between said opposing surfaces of abutting layers of the multilayered material such that the printing, indicia and /or security means is visible from the outside of said layered material and is trapped between the layers and is isolated from deliberate or inadvertent physical obliteration.

Preferably, the laminated transparent layer comprises a multi layer composite of plastics materials such as but not limited to PVC. The indicia and/or security means is either applied to a surface of at least one layer wherein the surface abuts a surface of an adjacent layer or is sandwiched intermediate opposing layers and wholly contains the printing, indicia and/or security means so they are visible but free of contact with a product inside a package wholly or partly formed by the layered material and is isolated from deliberate or inadvertent physical obliteration.

In another form according to the method aspect, the present invention comprises: a method of producing a layered product or security packaging material for holding a product therein wherein printing, indicia or the like and /or security means is contained on or trapped between one or both of opposing surfaces of said layers:

the method comprising the steps of:

- a) selecting at least two layers of material selected from materials such as PVC, polyethylene, PVC/PCdc, Alcar, Polypropylene, polyester, nylon, oriented polystyrene film;
- b) selecting a surface of a first of said layers of material on or against which to apply printing, indicia, and/or security means;
- c) applying printing or other indicia, and/or security means to the selected surface of said material;
- d) passing said first layer through a first set of rollers;

- e) applying an adhesive to a surface of said first layer;
- f) passing said first layer through an oven set to a predetermined temperature;
- g) passing said first layer through a second set of rollers after exiting said oven;
- h) at the same time, passing a second of said layers through said second set of rollers with said first layer to form a two layer laminate wherein said printing or other indicia and/or security means is introduced and trapped between said layers.

The method comprises the further step of using the laminated material formed in steps a) - h) in a product or in a package for holding a product. Where a multilayer structure having no more than two layers is required step a) and steps d) -g) are repeated.

DETAILED DESCRIPTION

The present invention will now be described in more detail according to a preferred but non limiting embodiment and with reference to the accompanying illustrations; wherein

- Figure 1 shows an exploded view of an example of a typical prior art blister package: used for containing drugs and
- Figure 2 shows a package including a laminated layer with entrapped printing according to a preferred embodiment.
- Figure 3 shows a typical lamination process for the production of a two layer laminate.
- Figure 4 shows a schematic layout of an arrangement for the construction of a multilayered film for use in packaging and including a security device such as a hologram.
- Figure 5 shows a schematic layout of an arrangement similar to that shown in figure 4 this time with a microchip as a security device.

Figure 1 shows a typical prior art blister package 1 for holding tablets and exploded into constituent layers. These packages are typically of layered construction including a plastics layer 2 formed from a transparent or opaque plastics material such as PVC. The invention is applicable to a wide range of plastics films selected from but not limited to PVC, Polyethylene, PVC/PVdC, Aclar, Polypropylene, Polyester, Nylon, Oriented Polystyrene

film. The invention is also adaptable to metallic multilayer structures. Oriented Polystyrene films are used for window facing for envelopes. Nylon films are used for lamination and barrier packagaing applications. Polyester films are treated PET films used for metallised films, decorative packaging, overwrapping films, thermoforming, bags and similar laminated and printed films for packaging various products. PVC films are generally used for printing, Pharmaceutical, stationery, credit cards, thermoforming, vacuum forming and food packaging applications. Various grades and surfaces are available as well as clear or opaque and are printed via gravure, UV offset offset - oxidation or screen print methods or coloured according to application need. The materials selected may be flexible or rigid depending upon packaging requirements. Thus, the material of packaging itself can now function as a security against product enhancement or authenticity, counterfeits and product tampering as the security means is trapped between layers of the material. One application of the present invention to layered material will be described below according to one embodiment.

Plastics layer 2 may be a multi layer composite produced by vacuum forming. The plastics product is typically prefabricated before use in the packaging. The packaging and forming of the plastics material may be done simultaneously

Package 1 further comprises closure layer 3 which is typically frangible and metallic (aluminium for instance) and is glued to plastics layer 2. Printed matter has traditionally been applied to the outer surface 4 of layer 3. Should the printing be in contact with the product the supplier must satisfy the regulatory authorities that the contact would not in any way impair or affect the product. The figure shows a three layer composite for the plastics layer comprising sub layers 2a, 2b and 2c. The printing usually conveys useful product information such as dosage,

constituents and strength but as it is exposed, it is susceptible to physical deterioration or obliteration. Access to the package contents is gained by rupturing frangible layer 3 to gain access to receptacles 5 which usually involves obliteration of some of the printing. It is desirable that the printing be protected from physical obliteration at the least to ensure that the information can be read at least until the contents are fully consumed. This may be important in the case of new or potent and harmful drugs and particularly where the package may be used in nursing homes. Also, ensuring that printing cannot be tampered with or easily copied provides a valuable hedge against illegal counterfeit activity.

Figure 2 shows a blister pack arrangement 10 similar to that shown in Figure 1 with the metallic layer 12 exploded from multi layer composite 11. The significant difference between this package and that of figure 1 is the inclusion in the former of printing or other indicia which is trapped but legible between opposing surfaces of the multi layer composite comprising plastics layers 11a, 11b and 11c. The printing may appear on any surface of the composite other than that which will be in contact with the contents and that exposed to the outside. Accordingly, to achieve the objects of the invention the printing may appear on either surface of layer 11b, the upper surface of layer 11c or the underside of layer 11a. This satisfies the dual requirement of no contact between print and the contents and isolation from physical deterioration or obliteration. As access to the trapped printing layer is impossible without total destruction of the package tampering or counterfeiting can be deterred and the information conveyed remains untouched at least for the life of the package.

According to one embodiment, the form of indicia used is printing and in this case a typical package, may be constructed according to the following method. First, a transparent material is selected which will form a transparent layer of the package.

To ensure that the printing can be trapped between opposing surfaces, the transparent material must be a composite of at least two layers of either the same or different material provided an outer layer is transparent to ensure visibility of the printing. Three, four or more layers may be employed according to packaging requirements and objectives. In the case of use of more than two layers the printing may be applied on any surface opposed by another surface but as the layers are transparent it will be difficult to detect visually on which surface the printing has been placed nor would it affect integrity of the printing. The first step in the manufacture of the transparent composite is to select the surface on which the indicia such as printing will appear. The printing or other indicia is applied to the selected surface or surfaces. This surface is then printed following which it is introduced into a lamination step where constituent layers are laminated ensuring that the printed layer is trapped between layers and is not exposed to the product or to the outside. The remaining steps are carried out according to conventional processing except that it will no longer be mandatory to print the metallic layer as in the prior art.

Where multiple layers are employed it is desirable to print close to the surface through which the printing will be viewed to reduce any obfuscation by refraction through multiple layers.

Optimum materials to use are PVC/ PVDC or derivatives thereof. The ink selected for the printing must be such that delamination of the layers will not occur.

It will be appreciated that there is wide material choice for the plastics used in the described applications such as polyethylene, low density PE, ABS, silicon or polycarbonate provided the materials satisfy the requirement of stability and suitability for end use.

An advantage of the present invention in its various forms is that there is no compromise to the products contained in the packaging. This is particularly important where consumables such as

drugs are concerned as it is imperative due to regulatory requirements that there be no contact between anything other than approved biocompatible packaging material and the product contained by the package. A further advantage of the invention is that there is little or no impact on cost of the packaging as it is implemented during the manufacturing process. A further advantage is that the security means between layers cannot be subject to undetected duplication or tampering unless the package is destroyed.

The pharmaceutical industry is one which is likely to benefit from the application of the invention and there is no impact on existing regulatory requirements as the security is trapped between layers of the packaging material eliminating any contact with the product. The embedding of the security device between layers deters illegal labelling and passing off of counterfeits as genuine articles. The genuine article will have the selected product identity and/or security means embedded between layers and therefore inaccessible unless the package is tampered with.

Referring to figure 3 there is shown a schematic layout of a process for the lamination of a multilayer material for use in packaging. The process shown comprises a first set of rollers 20 which unfurls an untreated plastics layer 21 such as PVC. One roller may be a gravure cylinder etched to allow an even coating of adhesive to be applied to a surface of the plastics being an inner surface. The adhesive used may be a solvent based material made up of adhesive catalyst and alcohol. Water based or dry bond adhesives may also be used. Plastics layer 21 is fed via intermediate rollers 22 and 23 into nip 24 whereupon roller 25 applies an adhesive layer (not shown). PVC layer is then fed into an oven 26 set at a predetermined temperature which may be set at a temperature in the order of 90 degrees. Upon exiting oven 26, layer 21 is fed into hot nip rollers 27 which control the pressure of the lamination process. At the same time, PVC layer 28

is introduced into nip 27 whereupon layers 21 and 28 combine to form laminated layer 29 which is then run to a final roll for cutting to the desired length. The laminated layer may then be used in packaging or in a product. Figure 4 shows a schematic arrangement in which a security device is introduced between layers in the manufacturing of a laminated material according to the method aspect of the present invention. In the embodiment shown, which has been numbered as for the corresponding part in figure 3 layers 21 and 28 are joined at conjunction 30 which forms a nip into which a security device 31 is fed. The security identity or device may either be a hologram layer 32 as shown or it may comprise an electronic device such as a micro chip which will be trapped between layers. It may also comprise a plurality of devices and indicia embedded between layers. The micro chip will contain information relating to the identity and origins of the product for which the laminated material will be used to pack. Alternatively, the security device may be affixed to either layers 21 or 28 prior to nip feeding. Laminated layer 29 will completely conceal the the selected security device or indicia. In the case of printing this may be applied to inner surfaces 21a and/or 28a prior to nip feeding.

Figure 5 shows a schematic arrangement in which a security device is introduced between layers in the manufacturing of a laminated material according to the method aspect of the present invention. In the embodiment shown, which has been numbered as for the corresponding part in figure 4 layers 21 and 28 are joined at conjunction 30 which forms a nip into which a security device 31 is fed. The security device in this instance is a microchip which may be glued or heat sealed to either one or both of inner surfaces 21a or 28a. The micro chip is one example of a number of possible security devices which may be introduced between layers 21a and 28a for complete concealment. The micro chip will contain information relating to

the identity and origins of the product for which the laminated material will be used to pack.

Alternatively, the security device may be affixed to either layers 21 or 28 prior to nip feeding.

Laminated layer 29 will completely conceal the the selected security device or indicia. In the case of printing this may be applied to inner surfaces 21a and/or 28a prior to nip feeding.

The finished laminate may then be used in the construction of multilayer products such as CD Roms, music compact discs and the like or as partial or complete product packaging.

Referring to figure 5 there is shown a schematic layout of an arrangement for introducing a security device during the process of manufacture of a laminated material. The process described is much the same as that described as for figure 4 except that instead of introducing a hologram into the laminate as the security device an embeded microchip is used.

According to an alternative embodiment, the product indicia and/or security device may be used in a product such as a CD Rom, computer software or music or video compact disc. These products include multilayer construction which allows for concealment of the indicia and/or security devices between layers of the multi layer material. The security device or indicia trapped between layers of the laminated material may be microdots, microthreads, microtext, foils, heat sensitive inks optically variable devices, coatings, holograms and electronic devices and the like.

It will be recognised by persons skilled in the art that numerous variations and modifications may be made to the invention as broadly described herein without departing from the overall spirit and scope of the invention as broadly described herein.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

- 1 A multilayer structure for use as a packaging material or as a constituent of a package for retaining an article or articles therein; wherein, the multilayer structure includes at least two layers each having an inner and outer surfaces wherein the outer surfaces are exposed and the inner surfaces are in opposing relationship, wherein the multi layer structure includes between said layers, indicia and/or a security device which is trapped therebetween and protected from physical contact with any object other than said opposing surfaces thereby providing security against tampering with the package or the contents of said package.
- 2 A multilayer structure according to claim 1 wherein said at least one concealed surface is formed by engagement between opposing layers.
- 3 A multilayer structure according to claim 2 wherein said security indicia and/or device is/are retained between said opposing concealed surfaces of said multilayer structure thereby providing a physical barrier against physical contact or obliteration.
- 4 A multilayer structure according to claim 3 further comprising an adhesive layer which enables adhesion of said opposing surface of said layers.
- 5 A multilayer structure according to claim 4 wherein the structure comprises at least first and second layers, the first layer comprising an outer surface and an inner surface and the second layer comprising an outer and inner surface; wherein, the outer surface of said first layer is exposed and the outer surface of said second layer is also exposed, wherein said inner surface of said first layer and said inner surface of said second layer are in opposing relationship and retain therebetween said security indicia and/or device means thereby rendering said structure or contents of a package formed from the structure free from tampering and counterfeiting.

6 A multilayer structure according to claim 5 wherein said security indicia and/or device may include one or more of printing, a micro chip, sim card, memory chip, hologram or liquid crystal.

7 A multilayer structure according to claim 6 wherein the security indicia is printing applied to one or more concealed surfaces and wherein the printing is distributed over the structure to maximise security against tampering and counterfeiting.

8 A multilayer structure according to claim 7 wherein the package is a blister pack including at least one formation in said multilayer structure for receiving at least one article and a closure layer which abuts at least a part of said outer surface of said first layer thereby sealing said package.

9 A multilayer structure according to claim 8 wherein there are two laminated layers.

10 A multilayer structure according to claim 9 wherein said layers are transparent.

11 A multilayer structure according to claim 10 wherein said security indicia and/or device is/are visible between the layers.

12 A multilayer structure according to claim 11 wherein the material of said layers may be selected from one or more of PolyVinyl Chloride, Polyethylene, PVC/PVdc, Aclar, Polypropylene, Polyester, Nylon, oriented Polystyrene film.

13 A multilayer structure for use in a package for holding an article and which includes a security element and/or indicia, characterised in that the security element and /or indicia is retained between layers of the multi layer structure such that the security element and /or indicia is not exposed to the outside or to direct contact and further characterised in that said security element and /or indicia, comprises one or more of printing, a micro chip, silicon chip, sim card, memory chip, microdot, microtext, microthread, foil, heatsensitive ink, optically variable

devices, coatings, hologram, liquid crystal or the like.

14 A package for holding at least one article and including a multilayer structure including at least two layers each of which include one exposed surface and at least one concealed or protected surface wherein opposing concealed surfaces retain therebetween a security element and/or indicia which is protected from direct physical contact or obliteration, thereby providing security against counterfeits and tampering with the contents of said package.

15 A package according to claim 14 wherein said at least one concealed surface is formed by engagement between opposing layers of said multilayer structure.

16 A package according to claim 15 wherein said security element and/or indicia is/are retained between opposing concealed surfaces of said multilayer structure thereby providing a barrier against access to said element and/or indicia.

17 A package according to claim 16 wherein the multilayer structure further comprises an adhesive layer which enables engagement of opposing layers.

18 A package according to claim 17 wherein the layers of said multilayer structure may be selected from PolyVinyl Chloride, Polyethylene, PVC/PVdc, Aclar, Polypropylene, Polyester, Nylon, oriented Polystyrene film.

19 A package according to claim 18 wherein the multilayer structure comprises at least first and second layers, the first layer comprising an outer surface and an inner surface and the second layer comprising an outer and inner surface; wherein, the outer surface of said first layer is exposed to physical contact and the outer surface of said second layer is in contact with contents of a product retained by said package, wherein said inner surface of said first layer and said inner surface of said second layer are in opposing relationship and retain therebetween at least one of

said security means and/or identity indicia such that said security means and/or indicia is protected from physical access thereto or contact with a product in said package, thereby providing resistance against package and/or product tampering and counterfeiting.

20 A package according to claim 19 wherein said security element or indicia means on said protected surface may include one or more of printing, a micro chip, silicon chip, sim card, memory chip, microdot, microtext, microthread, foil, heat sensitive ink, optically variable devices, coatings, hologram, liquid crystal or the like.

21 A package according to claim 20 wherein the security indicia comprises printing applied to one or more said concealed surfaces and wherein the printing is distributed on the surface/s to maximise security against tampering and /or counterfeiting.

22 A package according to claim 21 wherein the package is a blister pack including at least one formation in said multilayer structure for receiving at least one article and a closure layer which abuts at least a part of an outer surface of said multilayer structure thereby sealing said package.

23 A package according to claim 22 wherein the multilayer structure comprises two, three, four or more laminated layers.

24 A package according to claim 23 wherein said said layers are transparent.

25. A package according to claim 24 wherein said security element and/or indicia is visible between the layers.

26 A package for holding an article therein and including a multilayer structure wherein the multilayer structure comprises at least first and second layers, the first layer comprising an outer surface and an inner surface and the second layer comprising an outer and inner surface;

wherein, the outer surface of said first layer is exposed to physical contact and the outer surface of said second layer is in contact with contents of an article retained by said package, wherein said inner surface of said first layer and said inner surface of said second layer are in opposing relationship and retain therebetween at least one security element selected from one or more of printing, a micro chip, silicon chip, sim card, memory chip, microdot, microtext, microthread, foil, heatsensitive ink, optically variable devices, coatings, hologram, liquid crystal or the like; such that said security means is protected from physical tampering or obliteration, thereby providing resistance against package and/or product tampering or copying.

27 A package including laminated layers of transparent plastics materials wherein the laminated layers are formed by a composite of at least two transparent constituent layers wherein at least one surface of the constituent layers includes indicia or information which is printed or otherwise displayed between said layers such that the indicia or information or said other display is permanent and is physically inaccessible but the indicia or information is visually accessible.

28 A layered material for use in packaging and comprising at least two separate constituent layers wherein a surface of one said constituent layers opposes a surface of another constituent layer wherein printing on one or both said opposing surfaces is trapped between said opposing surfaces of abutting layers or is applied to a surface which receives an abutting layer such that the printing is visible at least from the outside of said layered material between said constituent layers and is trapped between the layers such that it is isolated from deliberate or inadvertent physical tampering or obliteration and from contact with a product in packaging formed by said layered material.

29 A method of producing a layered security packaging material wherein printing, indicia or

the like and /or security means is contained on or trapped between opposing surfaces of said layers: the method comprising the steps of:

- a) selecting at least two layers of material selected from materials such as PVC, polyethylene, PVC/PCdc, Alcar, Polypropylene, polyester, nylon, oriented polystyrene film or metal foil;
- b) selecting a surface of a first of said layers of material on or against which to apply printing, indicia, and/or security means;
- c) applying printing, indicia, and/or security means to the selected surface of said material;
- d) passing said first layer through a first set of rollers;
- e) applying an adhesive to a surface of said first layer;
- f) passing said first layer through an oven set to a predetermined temperature;
- g) passing said first layer through a second set of rollers after exiting said oven;
- h) at the same time, passing a second of said layers through said second set of rollers with said first layer to form a two layer laminate wherein said printing indicia or the like and/or security means is introduced and trapped between said first and second layers.

30 A method of producing a product from a layered security material wherein printing, indicia or the like and /or security means is contained on or trapped between opposing surfaces of said layers: the method comprising the steps of:

- a) selecting at least two layers of material selected from materials such as PVC, polyethylene, PVC/PCdc, Alcar, Polypropylene, polyester, nylon, oriented polystyrene film;
- b) selecting a surface of a first of said layers of material on or against which to apply printing, indicia, and/or security means;
- c) applying printing, indicia, and/or security means to the selected surface of said material;
- d) passing said first layer through a first set of rollers;
- e) applying an adhesive to a surface of said first layer;

- f) passing said first layer through an oven set to a predetermined temperature;
- g) passing said first layer through a second set of rollers after exiting said oven;
- h) at the same time, passing a second of said layers through said second set of rollers with said first layer to form a two layer laminate wherein said printing indicia or the like and/or security means is introduced and trapped between said first and second layers.

31 A method according to claims 29 or 30 comprising the step of prior to feeding the material through the second set of rollers and alternative to step c) introducing said indicia and/or security device between said layers.

32 A method according to claim 31 wherein said indicia and/or security device is contained in or on a third layer

33 A product including a multilayered material, wherein the multi layered material includes concealed surfaces between which or on at least one of which a security device and/or printing, colouration, product indicia or the like is placed; characterised in that the security device and/or printing, colouration, product indicia or the like is retained between layers of the multi layer material such that the security device and/or printing, colouration, product indicia or the like is not exposed to outside contact or to physical obliteration.

31 A product according to claim 33 wherein the product is a compact disc.

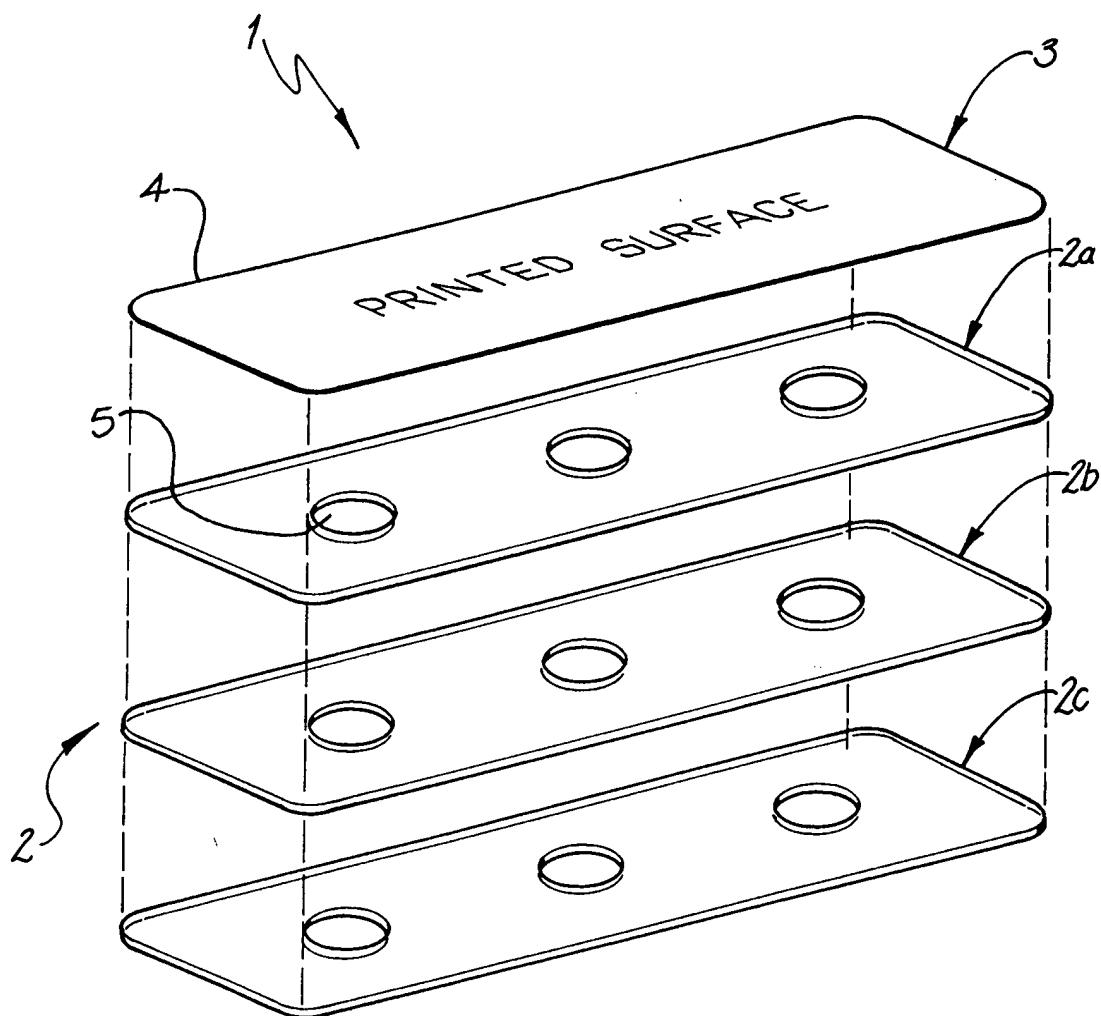


FIG. 1
PRIOR ART

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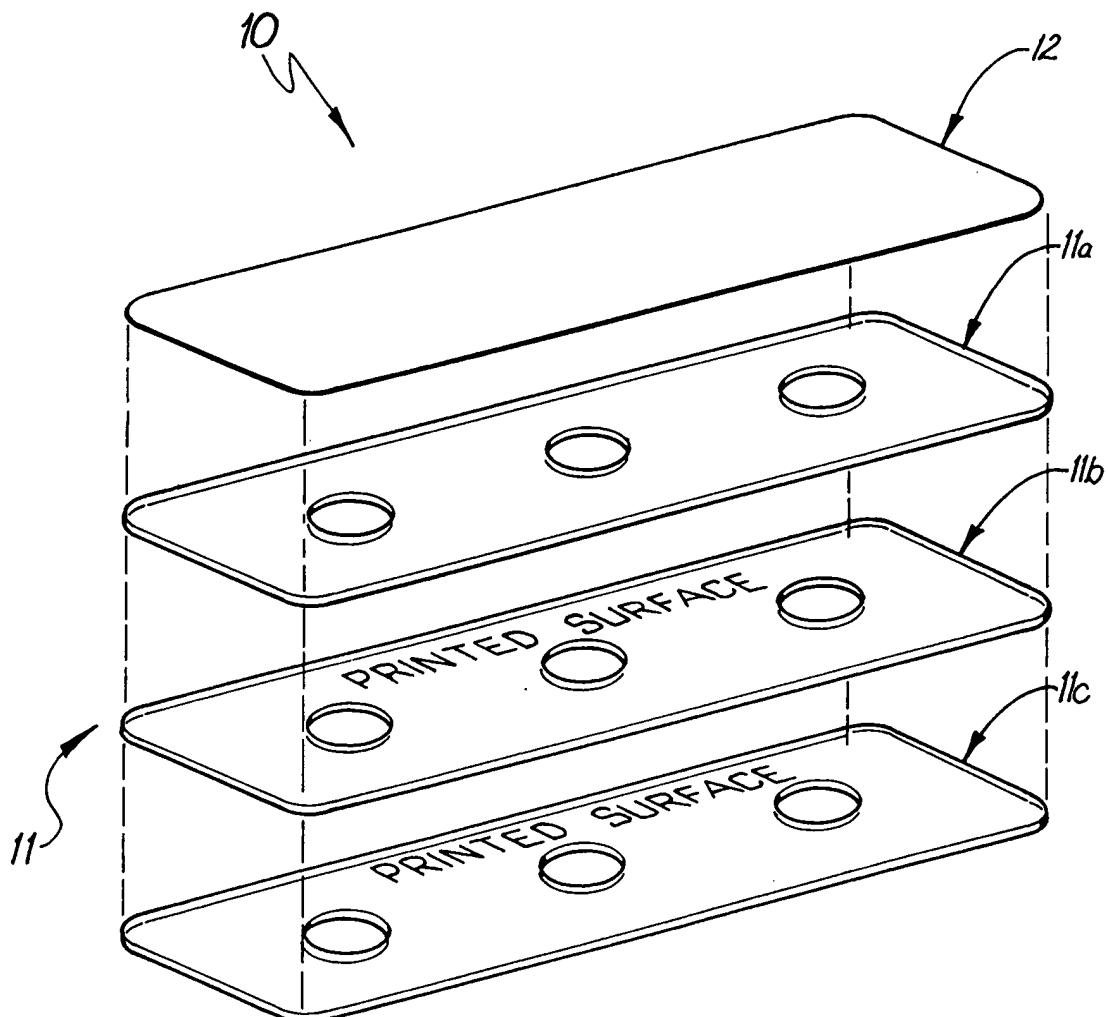


FIG. 2

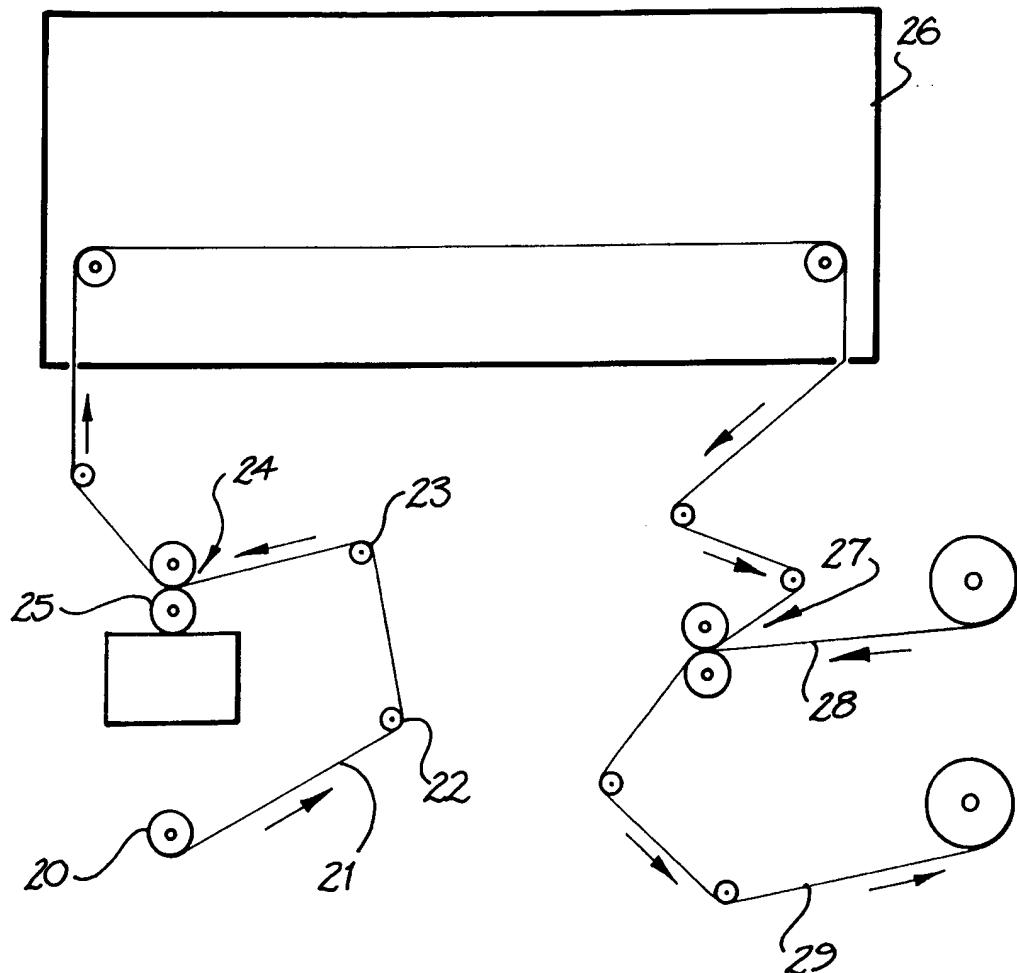


FIG. 3

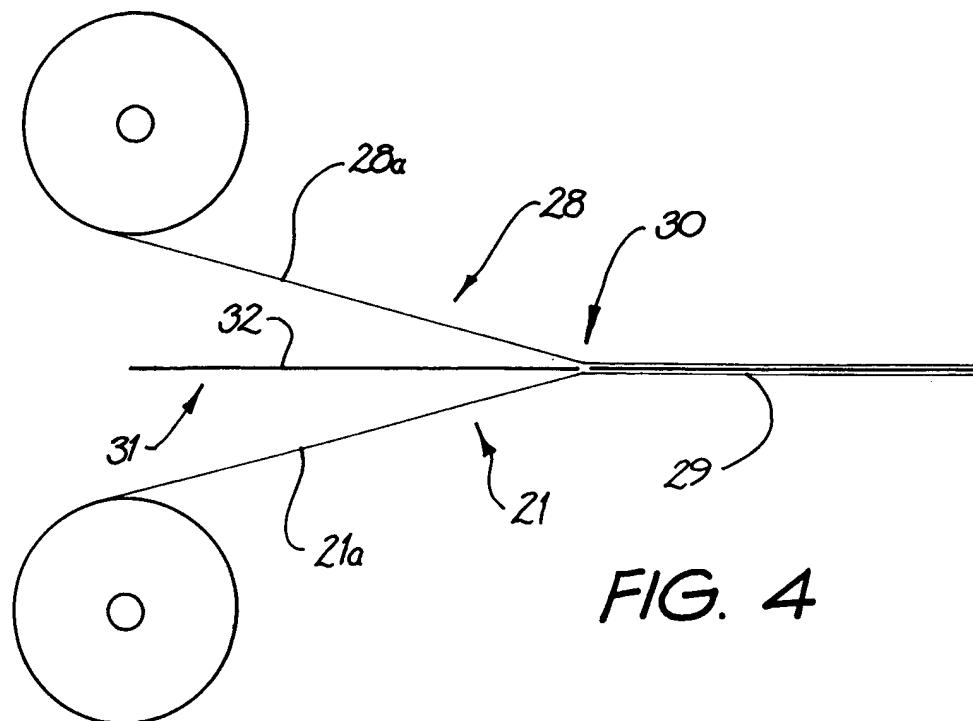


FIG. 4

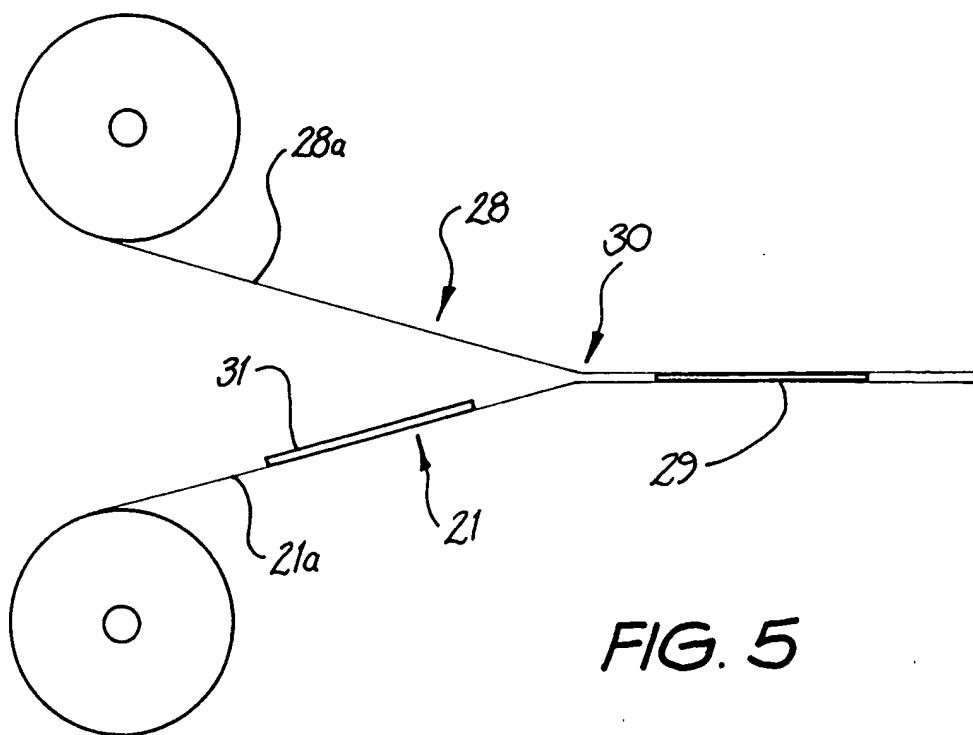


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No. PCT/AU00/00080

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. 7: B65D 65/40, 30/08, B32B 5/16, 7/10, 31/06		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC7: B65D 65/-, B65B 11/-, B42D 15/-, B32B, G09F 3/-		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT: (LAYER OR LAMINATE) AND (PACKAGE OR WRAP OR COVER)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0847 931 A (BURGOPACK STAMPA) 17 June 1998 See abstract	1-34
X	GB 2318084 A (TECKSOM INTERNATIONAL LIMITED) 15 April 1998 See abstract	1-34
X	US 5693416 A (KUCHEROVSKY) 2 December 1997 See abstract	1-34
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 18 April 2000		Date of mailing of the international search report - 4 MAY 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer KARYN MURRAY Telephone No : (02) 6283 2510

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00080

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5524758 A (LUPUL) 11 June 1996 See abstract	1-34
X	WO 91/19649 A (ALCAN INTERNATIONAL LIMITED) 26 December 1991 See abstract	1-34
X	US 4063641 A (KUEHN et al) 20 December 1977 See abstract	1-34
P, X	GB 2329607 A (AEP BORDEN PACKAGING UK LIMITED) 31 March 1999 See abstract	1-34
P, X	US 5948187 A (PEPI VALLONE et al) 7 September 1999 See abstract	1-34
P, X	US 5946781 A (KUO) 7 September 1999 See abstract	1-34

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/00080

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
EP	0847931	IT	960309				
GB	2318084	AU	46329/97	CN	1233213	EP	935530
		JP	10119224	US	5942077	WO	9816382
US	5693416	NONE					
US	5524758	CA	2177334				
WO	91/19649	AU	79773/91	CA	2083845	EP	535051
		US	5135262	US	5282650		
US	4063641	NONE					
GB	2329607	NONE					
US	5948187	NONE					
US	5946781	NONE					
END OF ANNEX							